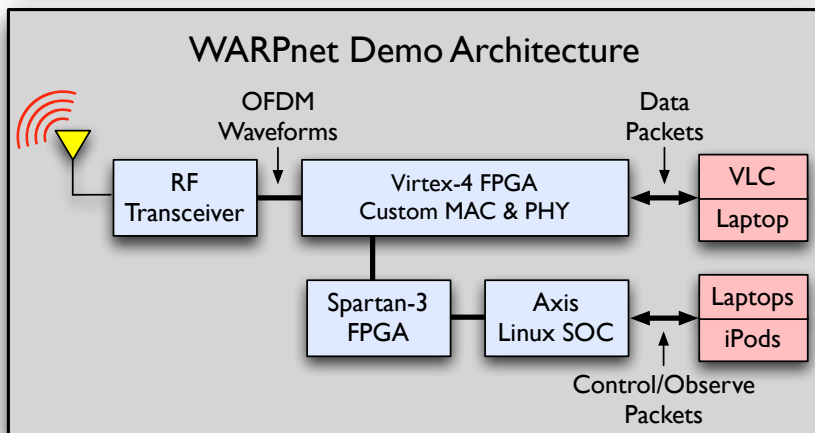
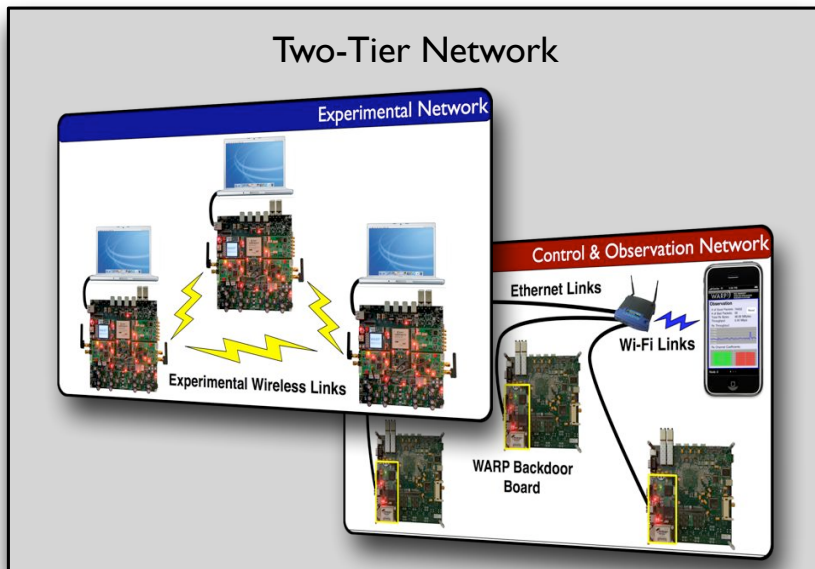


WARPnet: Clean Slate Research on Deployed Wireless Networks

Siddharth Gupta, Chris Hunter, Patrick Murphy and Ashutosh Sabharwal

{sgupta, chunter, murphpo, ashu}@rice.edu

<http://warp.rice.edu/>



In this demonstration we present the Wireless Open-Access Research Platform for Networks (WARPnet), a research testbed aimed at performing network level experiments at large scale. The platform is designed to support not only conventional research areas but also new modalities like cooperation and network coding. It is based on the Virtex-4 FPGA, which provides the resources to implement novel MIMO physical and MAC layer algorithms. Additionally, the platform adds an orthogonal wireless backdoor network that allows remote programming, control and monitoring of each node.

The demonstration showcases a three-node experimental wireless network. Operating in parallel to the experimental network, the WARP Backdoor Boards attached to each node connect to multiple WARPnet Controllers via a commercial Wi-Fi access point. WARPnet Controllers are platform agnostic. For this particular application, we use custom applications on Apple iPod Touch devices and laptops as WARPnet Controllers. Using these devices, demonstration participants can manipulate parameters in the experimental network and observe the results.

The WARPnet Controllers interface displays real-time network statistics. The top section shows a network diagram with three nodes and their connections. Below this, there are three graphs showing Rx Throughput for each node. The bottom section shows a graph of Real-time Channel Coefficients, with a plot of dB vs. MHz. The interface also includes detailed statistics and MAC/PHY control options.

Demonstration Summary

• Custom Real-time Physical Layer

- Flexible SISO/STBC/MIMO modes
- 10MHz Bandwidth

• Custom Medium Access Layer

- CSMA/CA

• Custom Remote Control/Observe

- Backdoor Board with multiple wired and wireless standard communication interfaces
- Apple iPod Touch & Apple laptop WARPnet Controllers to control and observe the experimental network